APPENDIX A
Cumulative Projects Narrative

Cumulative Projects
Badger Hills CBNG POD

Cumulative projects are those that have the potential to combine with the proposed action to create environmental impacts. For the Badger Hills POD the following projects are considered:

State and Fee CBNG Wells in the Badger Hills POD:
The State and Fee wells in the Badger Hills POD would be drilled interspersed with the federal CBNG wells, using similar infrastructure and water management practices. As such the impacts to surface water, and groundwater, will directly overlap with the proposed action to create environmental impacts. As such the impacts from these wells are discussed in the surface water and groundwater cumulative impacts sections under each alternative.

Existing CX Field CBNG Development:
The existing CX Field is located immediately to the west of the Badger Hills project, and is also being produced by Fidelity. The location of this field is shown on Map 4. The management of the water produced in the CX Field is closely related to the proposed management of the water from the Badger Hills project since both would discharge under the same MPDES permit. Therefore the impacts to surface waters from the CX Field are directly related to the impacts from the Badger Hills POD, and are included in the direct impacts section.

Drawdown related impacts from the CBNG wells in the CX Field are anticipated to be similar to the drawdown predicted for the Badger Hills POD. Drawdown of coal seam aquifers from CBNG production in the CX Field may extend up to 3.6 miles from the edge of CBNG production. Therefore these CBNG wells are taken into account in addressing cumulative drawdown related impacts.

Proposed CX Field infield drilling (36 Wells)
Fidelity has made a proposal to the MT-BOG for the drilling of an additional 36 CBNG wells in the CX Field in T9S, R40E, and in T9S, R39E. The BLM has not yet received a POD book relating to these wells. The locations of these wells are summarized in the table below.

Number	Mineral Ownership	Legal Location		
		Township	Range	Section
42C-1399	Federal	9S	39E	13
42M-1399	Federal	9S	39E	13
44C-1399	Federal	9S	39E	13
44M-1399	Federal	9S	39E	13
13D-1890	Federal	9S	40E	18
13M-1890	Federal	9S	40E	18
13C-1890	Federal	9S	40E	18
12D-1990	Federal	9S	40E	19
12M-1990	Federal	9S	40E	19
12C-1990	Federal	9S	40E	19
22C-2399	Federal	9S	39E	23
22M-2399	Federal	9S	39E	23
24C-2399	Federal	9S	39E	23
43C-2399	Federal	9S	39E	23
43M-2399	Federal	9S	39E	23
41C-2699	Federal	9S	39E	26
41D-2399	Federal	9S	39E	26
44C-2699	Federal	9S	39E	26
44D-2699	Federal	9S	39E	26
44M-2699	Federal	9S	39E	26
	State	9S	39E	36
	State	9S	39E	36
	State	9S	39E	36
	State	9S	39E	36
	State	9S	39E	36
	State	9S	39E	36
	State	9S	39E	36
	State	9S	39E	36
	State	9S	39E	36
	State	9S	39E	36
	State	9S	39E	36

It is anticipated that the water produced by these wells would be incorporated into the existing water management infrastructure in the CX Field. The quality of the water produced from these wells is expected to be similar to that produced from the Badger Hills POD since the same coal seams are being developed. As the existing MPDES permit allows only 1,600 gpm of produced water to be discharged to the Tongue River, and no application for additional discharge permits is known, Fidelity must manage the additional produced water without causing the discharge to the Tongue River to exceed the permitted 1,600 gpm. For this reason the cumulative impacts of these new proposed wells on surface water quality has already been accounted for in the direct impacts section of this analysis. These wells are located within the existing CX field, therefore the drawdown related impacts from these wells has been taken into account in the cumulative drawdown related impacts section of this analysis, which includes the CX field.

Wyoming CBNG Development:

As discussed in the effected environment section of this report, past CBNG discharges into the Tongue River watershed are incorporated into the water quality observed at the USGS station on the state line. The current policy of the WY-DEQ is to not allow any new CBNG discharge into the Tongue River. A small portion of the water produced in Wyoming and stored in on drainage impoundments, or used for irrigation, may eventually infiltrate, flow down gradient through the alluvial aquifers, and eventually join the alluvium of the Tongue River. Since the Tongue River is a loosing stream over this reach it is not anticipated that these potential changes in alluvial water chemistry will affect surface water quality. Since the infiltrated water will partake in the dissolution of soluble salts, and cation exchange processes with clays, the quality of the infiltrated water which eventually enters the alluvium is anticipated to be very similar to the existing alluvial groundwater quality. For these reasons, it is not anticipated that CBNG development in Wyoming will combine with the proposed action to create impacts to surface waters.

Drawdown related impacts from the CBNG wells in Wyoming are anticipated to be similar to the impacts predicted for CBNG wells in Montana since the same coal seams are being produced, and similar techniques are being used. Drawdown of coal seam aquifers from CBNG production in Wyoming is expected to extend approximately 3.6 miles from the edge of CBNG production. For the cumulative analysis the Wyoming development which has the potential to combine with the proposed action to create environmental impacts is addressed. This includes that development in Wyoming that is contiguous with or located within ~5 miles of the Badger Hills POD Area. Data from the Wyoming CBM Clearinghouse (http://www.cbmclearinghouse.info/) indicates that Wyoming CBNG development has extended up to the state line along the Tongue River, with a cluster of wells located to the south and west of the Badger Hills POD area (see the figures which follow in this appendix). The location of this field is shown on Map 4. These CBNG wells are taken into account in addressing cumulative drawdown related impacts.

Proposed Yates Exploration CBNG Wells (14 Wells)

Yates Petroleum has submitted APDs for the drilling and testing of 14 exploratory CBNG wells in Rosebud and Big Horn Counties. This proposal dose not include production of these areas, and as production infrastructure (particularly gas pipelines) has not reached this area it is not anticipated that full field production would occur in the near future even if economic quantities of gas were found in these areas. The Wall coal seam is the shallowest coal being tested by Yates. The Wall is stratigraphically below the Carney coal, which is the deepest coal being developed in the Badger Hills POD. No discharge of produced water has been proposed for these wells. The locations for these proposed wells are summarized in the table below.

Well Name	Map Abbreviation	Target Formation[1]	Surface Elevation (ft)	Estimated Total Depth (ft)	Watershed
PENSON RANCH CS FED COM	1Pens-Com	F-G	4165	1510	Leaf Rock Creek
TAFFY CS FEDERAL COM	Taffy CS Fed Com#1	B-A	3575	525	Canyon Creek

HALF MOON HILL CS FED COM	1Half-Com	B-A	4111	750	Leaf Rock Creek
LEAF ROCK CS FED	1Leaf	B-A	4039	710	Leaf Rock Creek
OTTER CS FED COM	1Otte-Com	B-A	3932	700	Leaf Rock Creek
ASHLAND CS FED COM	1Ashl-Com	B-A	3973	700	Leaf Rock Creek
BIRNEY CS FED COM	1Birn-Com	B-A	4000	700	Spring Creek
DECKER CS FED COM	1Deck-Com	B-A	4114	700	Spring Creek
JORDAN RANCH CS FED COM	1Jord-Com	B-A	4273	1000	Canyon Creek
TAINTOR DESERT CS FED COM	1Tain-Com	B-A	4162	800	Canyon Creek
TONGUE RIVER CS FED COM	1Tong-Com	B-A	4064	800	Fourmile Creek
POST CREEK CS FED COM	1Post-Com	B-A	4178	770	Post Creek
QUIETUS CS FED	1Quie	B-A	3986	750	Leaf Rock Creek
WEST ARM CS FED COM	1West-Com	W	3542	600	Tongue River Reservoir

1: B-A=Brewster-Arnold W=Wall F-G=Flowers-Goodale

If these wells prove to be productive it is reasonable to predict that they, and the leases associated with them, will be produced. Prior to production a detailed Water Management Plan must be submitted to the BLM and approved. An additional environmental analysis will be required before production can occur. Detailed analysis of impacts to surface waters from this project can not be conducted without the details of the Water Management Plan, however discharges that would cause surface water quality standards to be exceeded would not be allowed. Therefore this project may cause slight changes in surface water quality, however, standards will not be exceeded, and beneficial uses will not be impacted. As this project is not assured, and there is not sufficient detail to predict the impacts of this project, it is not included in the cumulative surface water analysis.

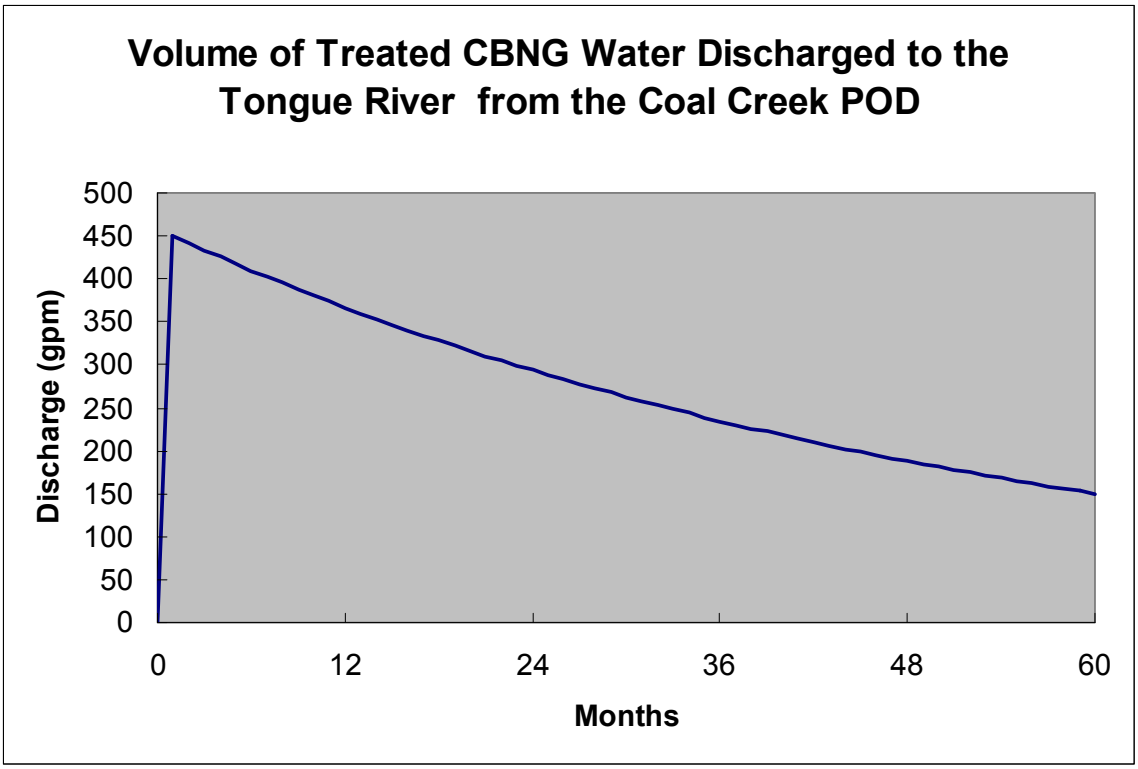
Drawdown related impacts from the Yates CBNG wells are anticipated to be similar to the impacts predicted in the CBM-EIS (BLM, 2003). Drawdown of coal seam aquifers from the Yates CBNG wells is expected to extend up to 5 miles from the edge of CBNG production. Since the coal seams that would be developed by Yates are different that those being proposed for development in the Badger Hills POD, the impacts from these projects do not have the potential to combine to create environmental impacts. Therefore the potential for the development of CBNG in this area is not taken into account in assessing cumulative drawdown related impacts.

Proposed Coal Creek POD (18 Wells)

Powder River Gas has submitted a proposal for the drilling testing and production of 16 CBNG wells, and the production of 2 existing CBNG wells. Eight of these wells are located on Federal minerals, while the other 10 are on private fee minerals. This POD area is located on the west side of the Tongue River, just downstream of the Tongue River Dam. These wells would be finished in the Wall, and Flowers-Goodale coal seams. The locations for these proposed wells are summarized in the table below. The location of this field is shown on Map 4. All of these well sites drain directly into the Tongue River, or flow to the Tongue River through ephemeral tributaries.

Name	Number	Legal Location	Lease Number
FEDERAL MINERALS:			
LONG FEDERAL	5-6W	Lot 5(SWNW),6,T8S,R41E	MTM88704
LONG FEDERAL	11-6F	NESW,6,T8S,R41E	MTM88704
LONG FEDERAL	11-6W	NESW,6,T8S,R41E	MTM88704
LONG FEDERAL	13-6F	Lot 7(SWSW),6,T8S,R41E	MTM88704
LONG FEDERAL	13-6W	Lot 7(SWSW),6,T8S,R41E	MTM88704
LONG FEDERAL	15-6F	SWSE,6,T8S,R41E	MTM88704
LONG FEDERAL	15-6W	SWSE,6,T8S,R41E	MTM88704
LONG FEDERAL	5-6F	Lot 5(SWNW),6,T8S,R41E	MTM88704
FEE MINERALS:			
PARADOX	1-7W	NENE,7,T8S,R41E	
PARADOX	1-7F	NENE,7,T8S,R41E	
PARADOX	3-7W	NENW,7,T8S,R41E	
PARADOX	3-7F	NENW,7,T8S,R41E	
PARADOX	7-7W	SWNE,7,T8S,R41E	
PARADOX	7-7F	SWNE,7,T8S,R41E	
PARADOX	11-7W	NESW,7,T8S,R41E	
PARADOX	11-7F	NESW,7,T8S,R41E	

The proposed management for the water produced from these wells will be through treatment. The construction of a Higgins Loop type ion exchange water treatment facility has been proposed. The effluent would be discharged directly into the Tongue River under a MPDES discharge permit. The residual brine produced by this process would be shipped off site and disposed of in a properly permitted injection well. This facility is anticipated to discharge at a maximum rate of 450 gpm (0.99 cfs). This rate of discharge is anticipated to decrease at a rate of 20% per year. The anticipated discharge to the Tongue River vs. time is shown in the chart below.



The discharged water is anticipated to have an EC of approximately 493 µS/cm and an SAR of approximately 0.03. As this discharge will be directly into the Tongue River it is included in the analysis of cumulative impacts to surface waters.

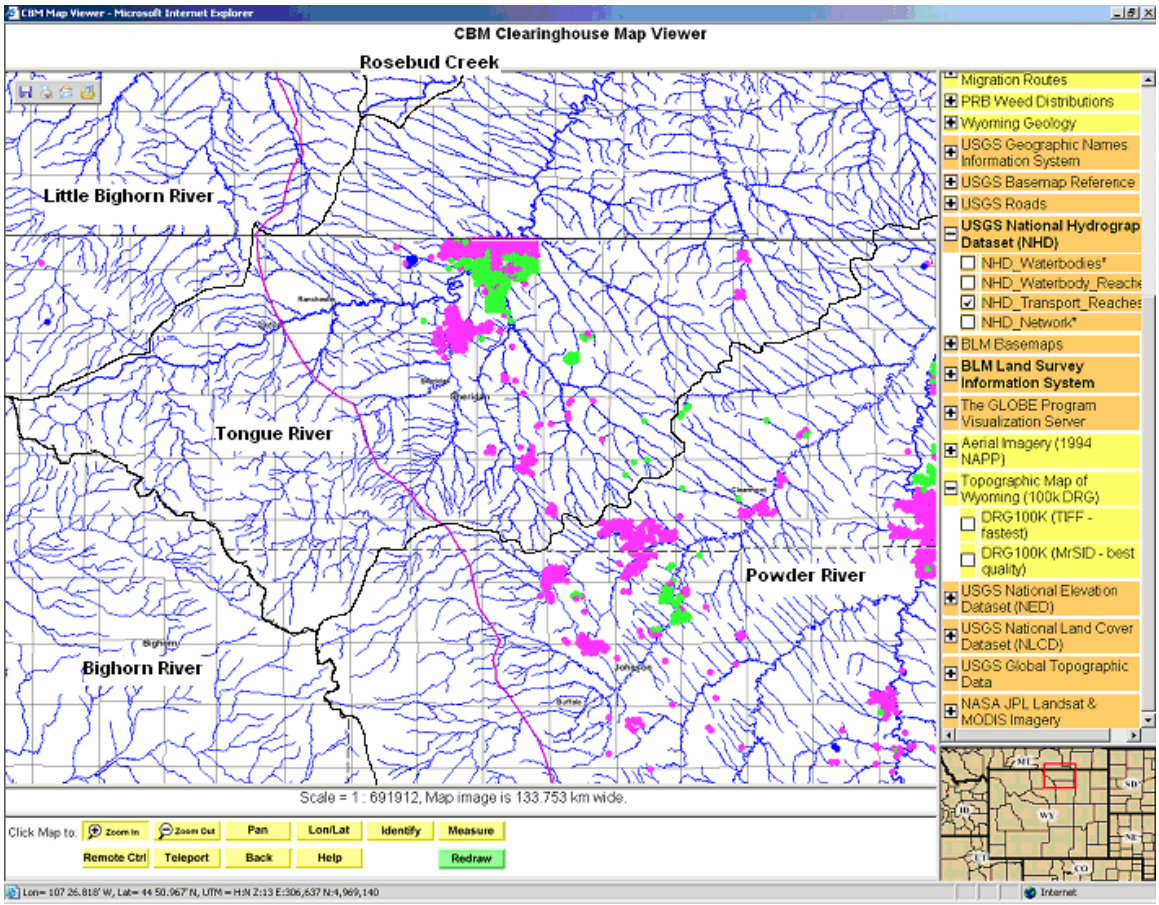
Existing Fidelity Scoria Pit

The disturbance associated with the existing Fidelity Scoria Pit could increase soil erosion rates, and increase suspended sediment loads in local surface waters; however, due to the erosion control practices being used at this site, the distance of this pit from live surface waters, and the presence of sediment filtering vegetation between the pit and live surface waters, the pit is not anticipated to appreciably affect surface water quality. Groundwater is not encountered in the pit and therefore is not affected.

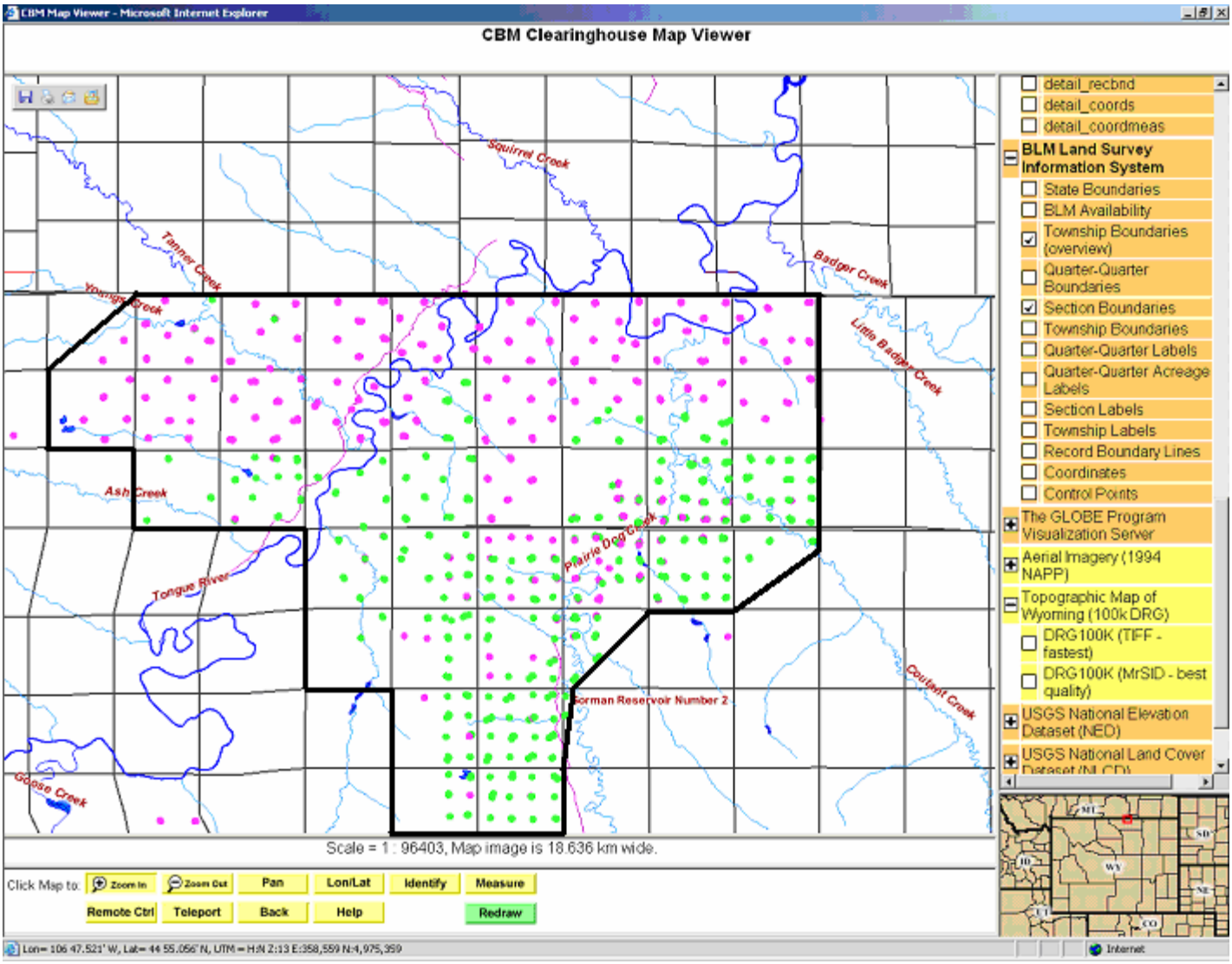
East Decker, West Decker, and Spring Creek Coal Mines

East Decker and West Decker coal mines have permits to discharge water derived from dewatering coal seams into the Tongue River Reservoir. As discussed in the surface water model narrative, the effects of these discharges have already been incorporated into the model to determine the effected environment. Spring Creek coal mine only has a storm water discharge permit since it is a dry mine. The chemistry of this storm water is not anticipated to be substantially different than the storm water entering the river from any other drainage, therefore the effects of this discharge are not evaluated in the surface water model.

The beneficial use of 235 gpm of CBNG produced water by the Spring Creek Coal Mine, and 370 gpm by Decker Coal Mine for industrial purposes, such as dust control, is not anticipated to impact surface water or ground water resources.



From the Wyoming CBM Clearing house (http://www.cbmclearinghouse.info/). Downloaded on 12/19/03.



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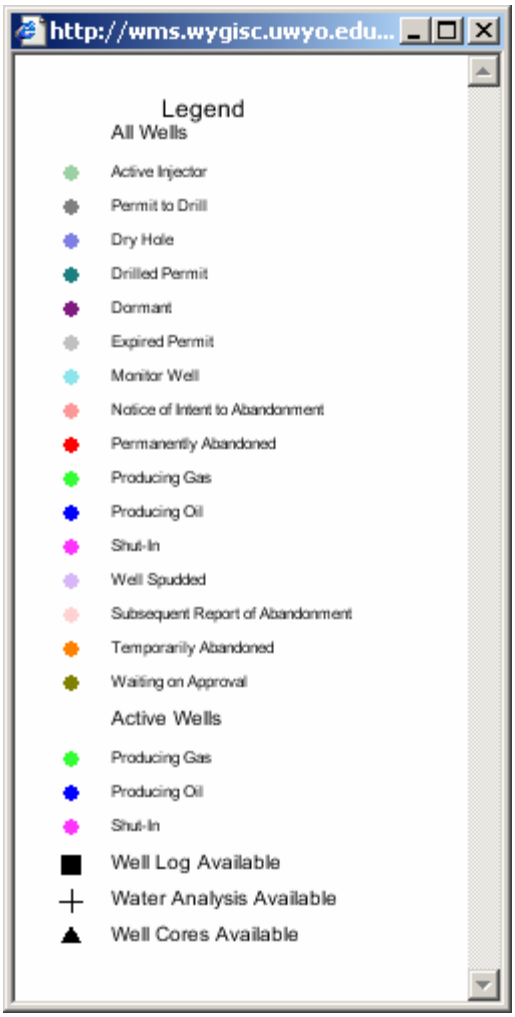
http://wms.wygisc.uwyo.edu...
Legend
All Wells
Active Injector
Permit to Drill
Dry Hole
Drilled Permit
Dormant
Expired Permit
Monitor Well
Notice of Intent to Abandonment
Permanently Abandoned
Producing Gas
Producing Oil
Shut-In
Well Spudded
Subsequent Report of Abandonment
Temporarily Abandoned
Waiting on Approval
Active Wells
Producing Gas
Producing Oil
Shut-In
Well Log Available
Water Analysis Available
Well Cores Available